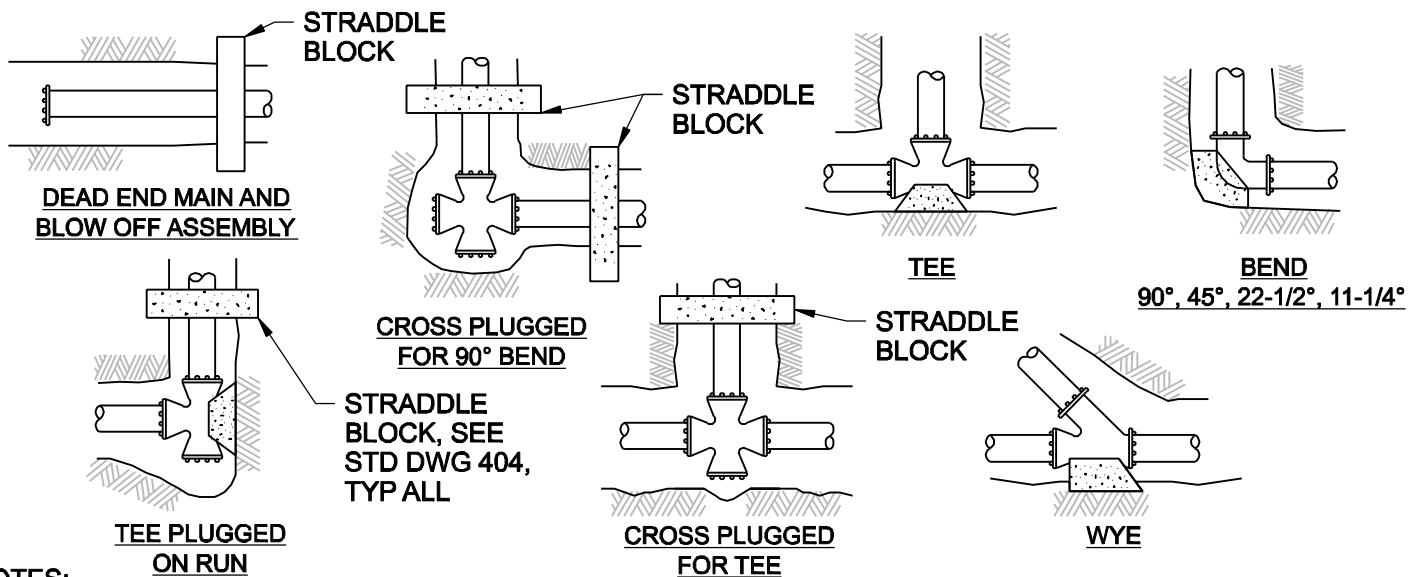


HORIZONTAL BEARING AREA OF THRUST BLOCKS (SQUARE FEET)

FITTING SIZE	TEE AND WYE	90° BEND AND TEE PLUGGED ON RUN	45° BEND	22-1/2° BEND	11-1/4° BEND
4"	1.4	2.0	1.1	—	—
6"	3.2	4.5	2.4	1.2	—
8"	5.7	8.0	4.3	2.2	1.1
10"	8.8	12.5	6.8	3.4	1.7
12"	12.7	18.0	9.7	5.0	2.5
14"	17.3	24.5	13.3	6.8	3.4
16"	22.6	32.0	17.3	8.8	4.4
18"	28.6	40.5	21.9	11.2	5.6
>18"	BY DESIGN ENGINEER				



NOTES:

1. THE USE OF CONCRETE BLOCKING WILL BE LIMITED TO CERTAIN APPLICATIONS AND WILL REQUIRE APPROVAL OF THE CITY ENGINEER. WATER PIPE AND FITTINGS SHALL BE MECHANICALLY OR INTERNALLY RESTRAINED WHERE POSSIBLE IN LIEU OF CONVENTIONAL CONCRETE BLOCKING. SEE STANDARD DRAWING 406 FOR MECHANICAL JOINT RESTRAINTS. HORIZONTAL THRUST BLOCKS AND MECHANICAL RESTRAINT LENGTHS SHALL BE REVIEWED BY THE DESIGN ENGINEER.
2. FOR CONFIGURATIONS SHOWN WITH CONCRETE STRADDLE BLOCKS, SEE STANDARD DRAWING 404.
3. CONCRETE GRAVITY BLOCKING IS NOT PERMITTED UNDER ANY CIRCUMSTANCES.
4. ABOVE BEARING AREAS ARE BASED ON A TEST PRESSURE OF 150 PSI, A 1.5 FACTOR OF SAFETY, AND AN ALLOWABLE SOIL BEARING STRESS OF 2,000 PSF. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION:

$$\text{BEARING AREA} = (\text{TEST PRESSURE} / 150) \times (2000 / \text{SOIL BEARING STRESS}) \times (\text{TABLE VALUE})$$
5. CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED SOIL AND SHALL HAVE A MINIMUM 28-DAY STRENGTH OF 3,300 PSI.
6. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES. FITTINGS SHALL BE WRAPPED IN 8 MIL PLASTIC PRIOR TO PLACEMENT OF CONCRETE.
7. THRUST BLOCKING CONFIGURATIONS MAY NOT WORK OUT FOR ALL FITTING SIZES. CONFIRM USE OF BLOCKING CONFIGURATIONS WITH DESIGN ENGINEER.



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**HORIZONTAL THRUST
BLOCKING**

NO SCALE

DIVISION

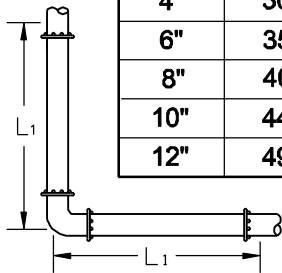
WATER

DRAWING NO.

402

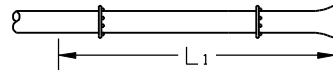
LENGTH (L₁) OF PIPE REQUIRED FOR RESTRAINT (FT)

PIPE	HORIZONTAL BEND				DEAD END	REDUCER (RESTRAINED LENGTH FOR LARGE DIA SIDE)				
DIA.	90°	45°	22-1/2°	11-1/4°		4"	6"	8"	10"	12"
4"	30	23	20	19	44	--	37	53	65	77
6"	35	25	21	20	55	--	--	38	53	67
8"	40	27	22	20	66	--	--	--	37	54
10"	44	29	23	21	76	--	--	--	--	51
12"	49	31	24	21	86	--	--	--	--	--

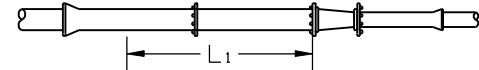


BEND

90°, 45°, 22-1/4°, 11-1/4°



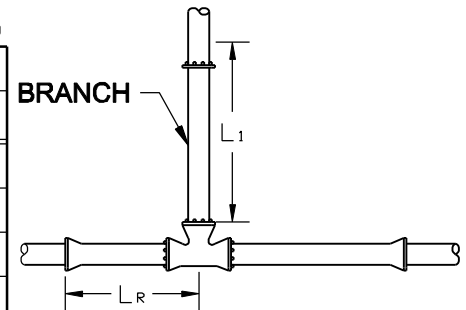
DEAD END



REDUCER

LENGTH (L₁) OF PIPE REQUIRED FOR RESTRAINT WHEN USING TEES (FT)

TEE CONFIGURATIONS (RESTRAINT LENGTH FOR BRANCH)										
Branch Pipe Diameter	L _R = 0	L _R = 2	L _R = 4	L _R = 6	L _R = 8	L _R = 10	L _R = 12	L _R = 14	L _R = 16	L _R = 18
4"	44	30	19	19	19	19	19	19	19	19
6"	55	45	36	26	19	19	19	19	19	19
8"	66	59	52	44	37	30	23	19	19	19
10"	76	70	64	58	53	47	41	35	30	24
12"	86	81	76	71	67	62	57	52	47	43



TEE CONFIGURATION

L_R IS THE MINIMUM LENGTH IN EITHER DIRECTION FROM TEE TO NEAREST ADJACENT JOINT

NOTES:

- ALL JOINTS WITHIN THE LENGTH "L₁" FROM THE ABOVE TABLE, SHALL BE RESTRAINED. THE JOINT RESTRAINT LENGTHS CALCULATED ARE FOR FITTINGS USED TO CHANGE PIPE HORIZONTAL ALIGNMENT ONLY. FOR APPLICATIONS WHERE FITTINGS ARE USED TO CHANGE THE SLOPE OF THE PIPE, THE DESIGN ENGINEER SHALL INCLUDE THE JOINT RESTRAINT REQUIREMENTS ON THE PLANS.
- IF AN UNANTICIPATED NEED FOR JOINT RESTRAINT ARISES TO CHANGE THE SLOPE OF THE PIPE, THE CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER. JOINT TYPES NOT COVERED ON ABOVE TABLE MUST BE DESIGNED INDIVIDUALLY IN ORDER TO DETERMINE APPROPRIATE RESTRAINED LENGTH.
- THE SMALL DIAMETER SIDE OF A REDUCER DOES NOT REQUIRE RESTRAINT IF THE LARGE DIAMETER SIDE IS PROPERLY RESTRAINED.
- ABOVE RESTRAINED LENGTHS ARE BASED ON:
 - * MINIMUM 2:1 SAFETY MARGIN
 - * TEST PRESSURE OF 150 PSI.
 - * 3' OF MINIMUM COVER.
 - * GRANULAR BASE ROCK BEDDING AND PIPE ZONE.
 - * WHEN ORGANIC OR CLAY TYPE SOILS ARE BEING USED FOR BACKFILL, GRANULAR BASE ROCK, MUST BE USED FOR BEDDING AND BACKFILL TO A HEIGHT OF 12" OVER THE TOP OF THE PIPE BEFORE OTHER SOILS ARE PLACED.
 - * UNCOATED PIPE. THIS TABLE IS NOT APPLICABLE FOR PIPE ENCASED IN POLYETHYLENE
- ANY REDUCTION OF THESE VALUES AS A RESULT OF OTHER CONDITIONS ENCOUNTERED SHALL BE BASED ON THE APPROPRIATE EVALUATION AND RECOMMENDATION BY THE DESIGN ENGINEER WITH APPROVAL BY THE CITY ENGINEER.
- RETAINER GLANDS SHALL BE COMPATIBLE WITH THE PIPE BEING RESTRAINED AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. RETAINER GLANDS SHALL BE MEGALUG (EBAA IRON), ROMAGRIP (ROMAC), OR UNI-FLANGE SERIES 1400 (FORD METER BOX).



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**MECHANICAL JOINT
RESTRAINTS**

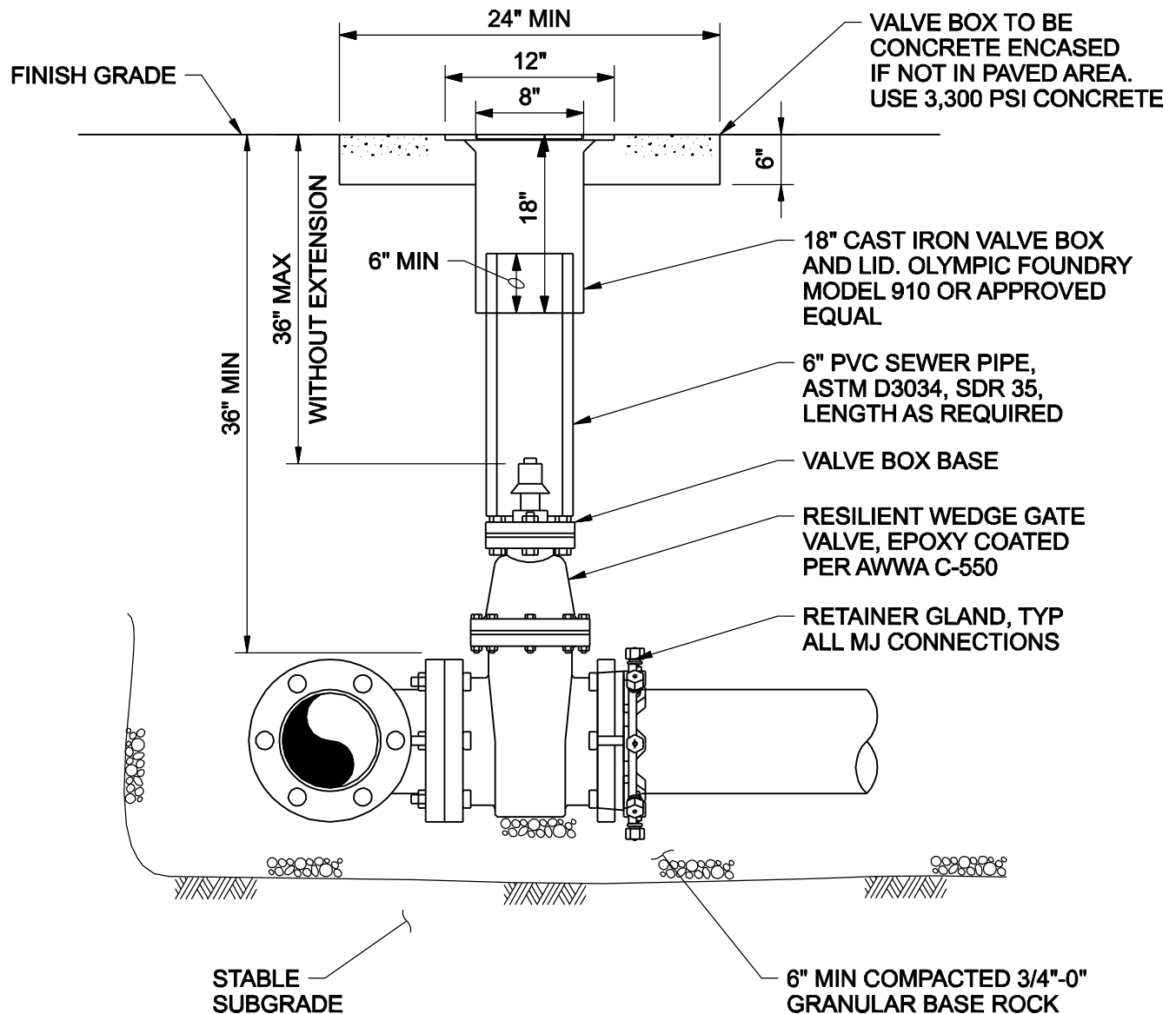
NO SCALE

DIVISION

WATER

DRAWING NO.

406



NOTES:

1. GATE VALVE SHALL BE RESILIENT WEDGE TYPE CONFORMING TO AWWA C-509.
2. GATE VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE OPERATING NUT. ADJUST VALVE BOX TO MEET FINISH GRADE.
3. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.



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**GATE VALVE AND
VALVE BOX ASSEMBLY**

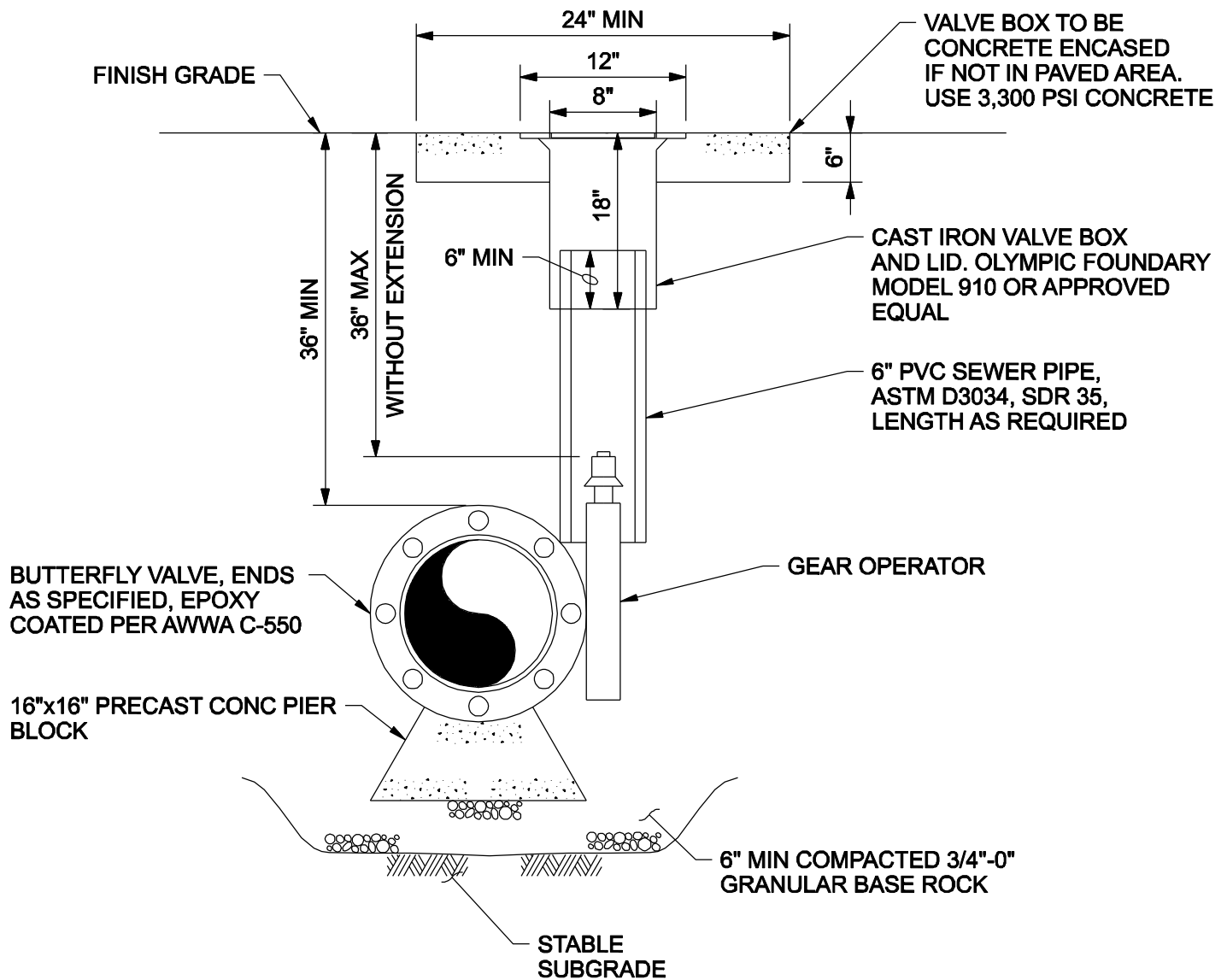
NO SCALE

DIVISION

WATER

DRAWING NO.

408



NOTES:

1. BUTTERFLY VALVE SHALL BE SHORT BODY, CLASS B VALVE PER AWWA C-504.
2. BUTTERFLY VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE OPERATING NUT. ADJUST VALVE BOX TO MEET FINISH GRADE.
3. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.



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**BUTTERFLY VALVE
AND VALVE BOX
ASSEMBLY**

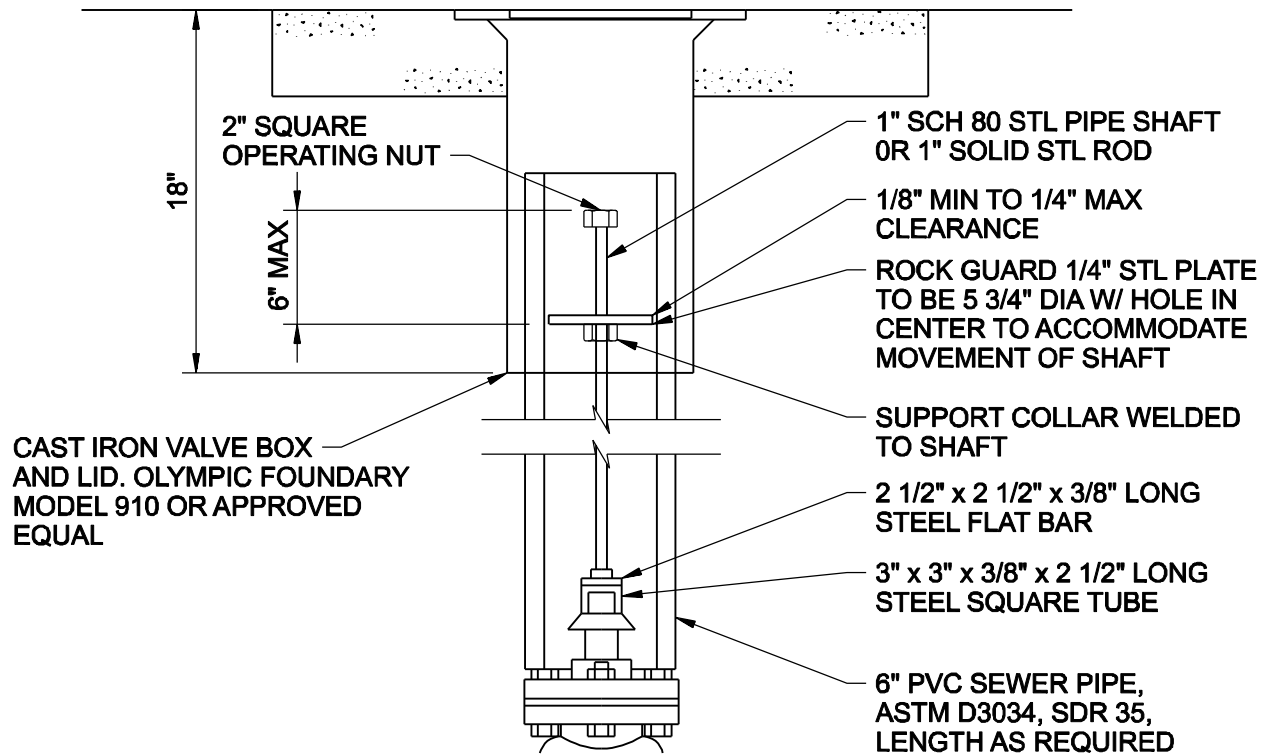
NO SCALE

DIVISION

WATER

DRAWING NO.

410



NOTES:

1. EXTEND 2" SQUARE OPERATING NUT TO WITHIN 18" OF FINISHED GRADE WHEN VALVE OPERATING NUT IS DEEPER THAN 3' FROM FINISH GRADE.
2. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.



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**VALVE
OPERATING NUT
EXTENSION**

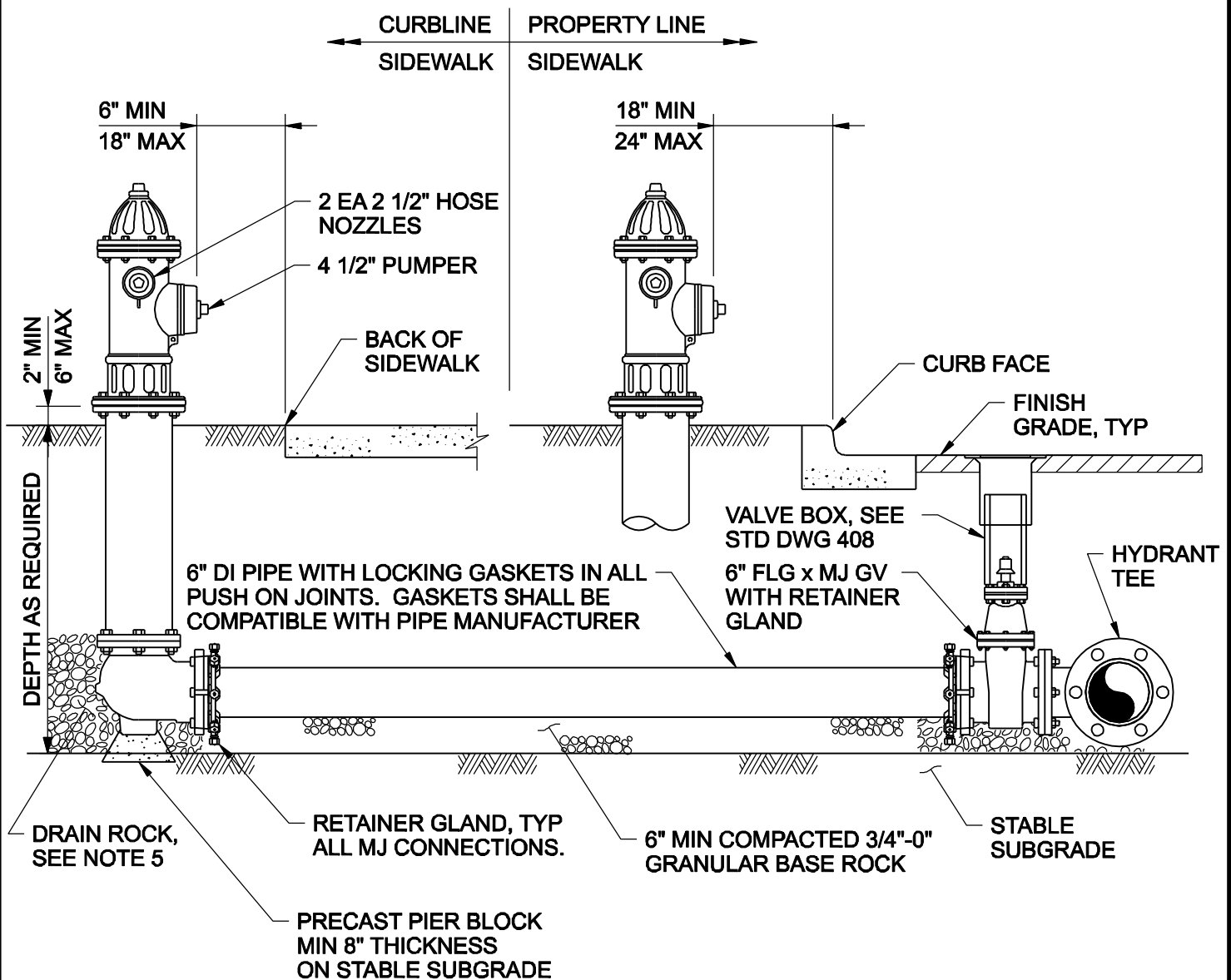
NO SCALE

DIVISION

WATER

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412



NOTES:

1. FOR PROPERTY LINE SIDEWALKS, WHEN HYDRANTS ARE PLACED ADJACENT TO THE CURB, THE HYDRANT PORT SHALL BE 18" MINIMUM AND 24" MAXIMUM FROM THE FACE OF CURB.
2. VERTICAL EXTENSIONS REQUIRED FOR HYDRANTS SET TOO LOW SHALL NOT BE ALLOWED UNLESS SPECIFICALLY APPROVED BY THE CITY ENGINEER. WHERE APPROVED, SUCH EXTENSIONS SHALL BE PROVIDED BY THE CONTRACTOR AND INSTALLED TO THE MANUFACTURER'S SPECIFICATIONS.
3. FIRE HYDRANTS SHALL NOT BE LOCATED WITHIN SIDEWALKS OR OTHER WALKWAYS WITHOUT CITY ENGINEER APPROVAL.
4. FIRE HYDRANTS SHALL BE KENNEDY K-81D GUARDIAN OR WATEROUS 5-1/4 PACER AND SHALL BE "SAFETY YELLOW" IN COLOR, PAINTED OR EPOXY COATED BY THE MANUFACTURER.
5. MINIMUM 4 CUBIC FEET OF 1 1/2" CLEAN DRAIN ROCK SHALL BE PLACED AROUND HYDRANT SHOE UP TO 6" MINIMUM ABOVE THE DRAIN OUTLETS.



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**STANDARD FIRE
HYDRANT ASSEMBLY**

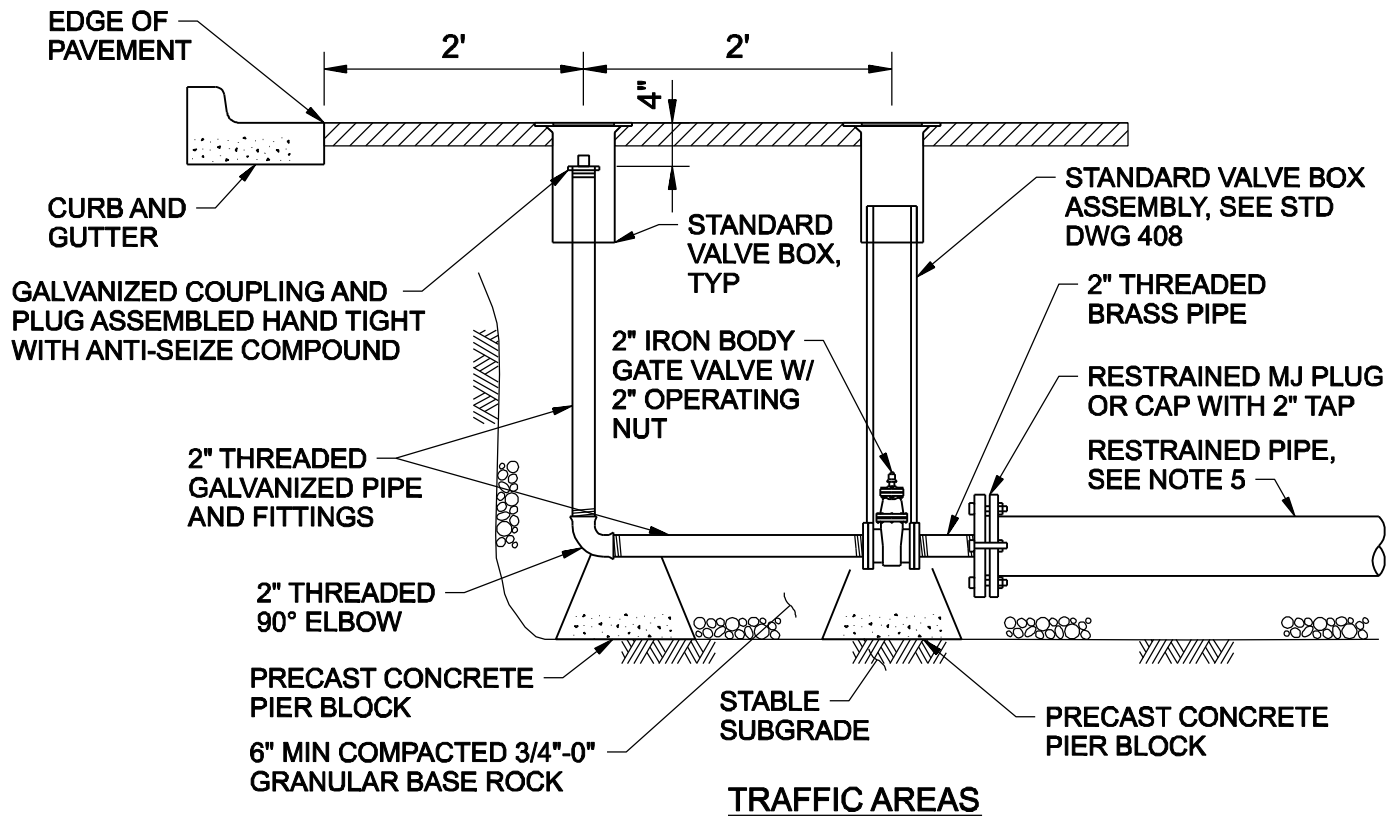
NO SCALE

DIVISION

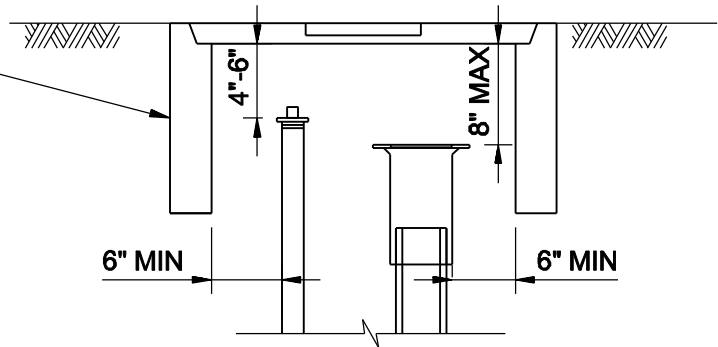
WATER

DRAWING NO.

414



CONCRETE METER BOX
17" x 30" x 12" ARMORCAST
OR APPROVED EQUAL



NOTES:

- BLOW-OFF SIZE MUST BE IN ACCORDANCE WITH AWWA FLUSHING FLOW RATES, BUT NOT LESS THAN 2" FOR 8" LINES AND SMALLER. FOR 4" AND LARGER, USE FIRE HYDRANT OR BLOW-OFF ASSEMBLY APPROVED BY THE CITY ENGINEER.
- BLOW-OFF IS NOT TO BE LOCATED IN GUTTERS OR DITCHES.
- THREADED CONNECTIONS SHALL BE ASSEMBLED USING COMPOUNDS APPROVED FOR USE IN POTABLE WATER SYSTEMS.
- IN AREAS EXPOSED TO TRAFFIC, INSTALL STANDARD VALVE BOX ASSEMBLIES ADJUSTED TO FINISH GRADE. IN NON-TRAFFIC AREAS, INSTALL STANDARD VALVE BOX OVER THE VALVE ONLY AND COVER THE VALVE BOX AND BLOW-OFF PIPE WITH AN ARMORCAST METER BOX WITH A CAST IRON COVER.
- RUNS OF PIPE WITH BLOW-OFF ASSEMBLIES SHALL BE MECHANICALLY RESTRAINED WITH LOCKING PUSH-ON GASKETS AND MEGA LUG RETAINER GLANDS. SEE STANDARD DRAWING 406 FOR DETAILS RELATIVE TO THE LENGTH OF PIPE TO BE RESTRAINED. CONCRETE THRUST BLOCKING SHALL NOT BE USED WITHOUT APPROVAL OF THE CITY ENGINEER.



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**STANDARD 2"
BLOW-OFF ASSEMBLY
(DEAD-END MAIN)**

NO SCALE

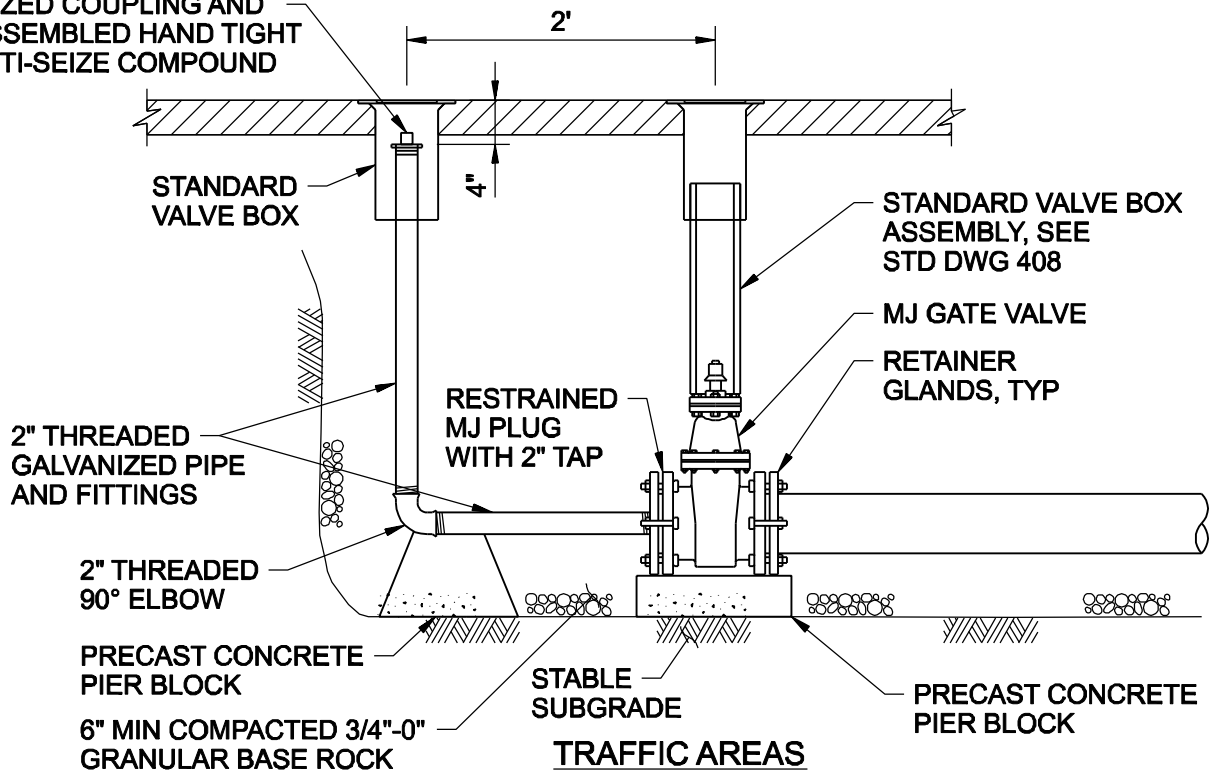
DIVISION

WATER

DRAWING NO.

416

**GALVANIZED COUPLING AND
PLUG ASSEMBLED HAND TIGHT
WITH ANTI-SEIZE COMPOUND**



NOTES:

1. BLOW-OFF IS TO BE USED WHEN REQUIRED BY THE CITY ENGINEER, AT THE ENDS OF WATERLINES THAT MAY BE EXTENDED IN THE FUTURE.
2. BLOW-OFF SIZE MUST BE IN ACCORDANCE WITH AWWA FLUSHING FLOW RATES, BUT NOT LESS THAN 2" FOR 8" LINES AND SMALLER. FOR 4" AND LARGER, USE FIRE HYDRANT OR BLOW-OFF ASSEMBLY APPROVED BY THE CITY ENGINEER.
3. BLOW-OFF IS NOT TO BE LOCATED IN GUTTER OR DITCH.
4. THREADED CONNECTIONS SHALL BE ASSEMBLED USING COMPOUNDS APPROVED FOR USE IN POTABLE WATER SYSTEMS.
5. IN AREAS EXPOSED TO TRAFFIC, INSTALL STANDARD VALVE BOX ASSEMBLIES ADJUSTED TO FINISH GRADE. IN NON-TRAFFIC AREAS, INSTALL STANDARD VALVE BOX OVER THE VALVE ONLY AND COVER THE VALVE BOX AND BLOW-OFF PIPE WITH AN ARMORCAST METER BOX WITH A CAST IRON COVER.
6. RUNS OF PIPE WITH BLOW-OFF ASSEMBLIES SHALL BE MECHANICALLY RESTRAINED WITH LOCKING PUSH-ON GASKETS AND MEGA LUG RETAINER GLANDS. SEE STANDARD DRAWING 406 FOR DETAILS RELATIVE TO THE LENGTH OF PIPE TO BE RESTRAINED. CONCRETE THRUST BLOCKING SHALL NOT BE USED WITHOUT APPROVAL OF THE CITY ENGINEER.



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**STANDARD
2" BLOW-OFF FOR
FUTURE EXTENSION**

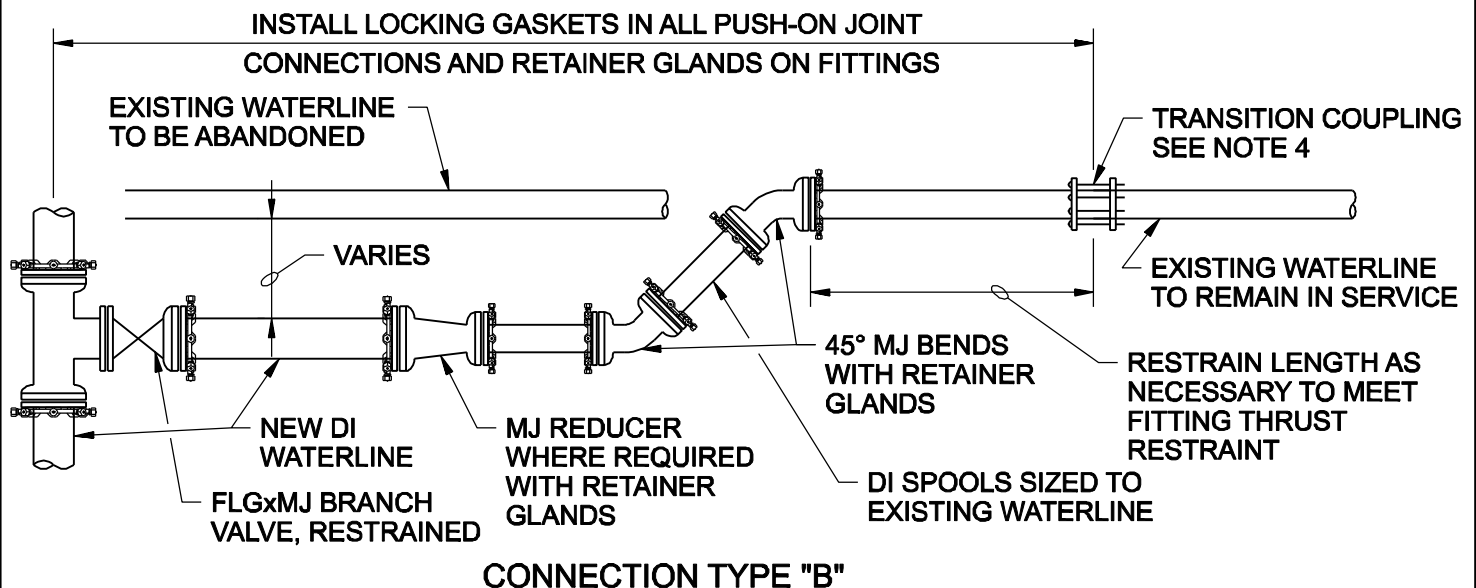
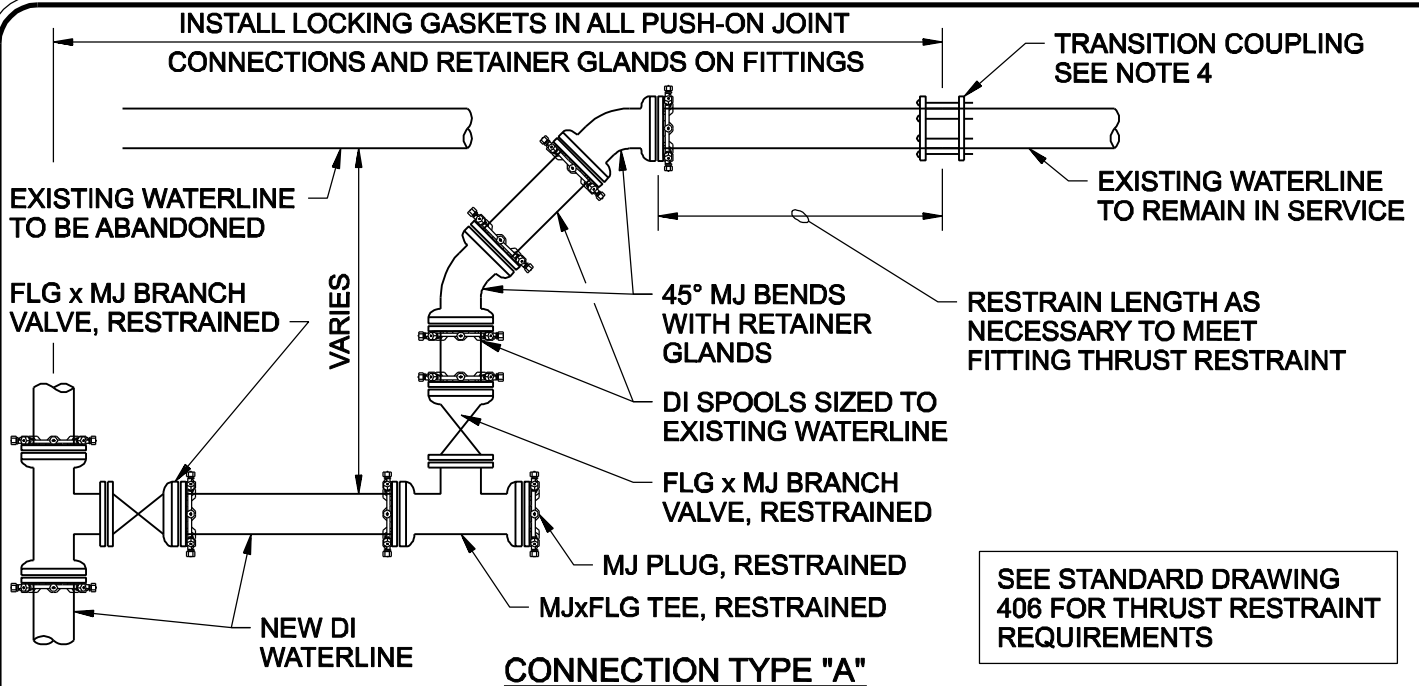
NO SCALE

DIVISION

WATER

DRAWING NO.

418



NOTES:

1. CONNECTION TYPE "A" IS FOR SITUATIONS WHERE THE NEW WATERLINE WILL ULTIMATELY BE EXTENDED TO REPLACE THE EXISTING WATERLINE.
2. CONNECTION TYPE "B" IS FOR SITUATIONS WHERE THE NEW WATERLINE IS EXPECTED TO REMAIN IN SERVICE FOR THE FORESEEABLE FUTURE.
3. UNLESS SHOWN OTHERWISE, THE CITY ENGINEER WILL DETERMINE WHICH CONNECTION STYLE IS APPROPRIATE FOR A GIVEN SITUATION.
4. WHEN THE EXISTING WATERLINE IS DUCTILE OR CAST IRON, USE A DUCTILE IRON SOLID SLEEVE MJ COUPLING TO MAKE CONNECTION TO EXISTING WATERLINE.
5. CONNECTION ASSEMBLY COMPONENTS NOT SUBJECTED TO PRESSURE TESTING WITH THE NEW MAINLINE WILL BE VISUALLY CHECKED FOR LEAKS AT LINE PRESSURE. VERIFICATION OF RESTRAINT REQUIREMENTS AND VISUAL INSPECTIONS WILL BE PERFORMED BY THE CITY ENGINEER.



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**STANDARD
CONNECTION
ASSEMBLIES**

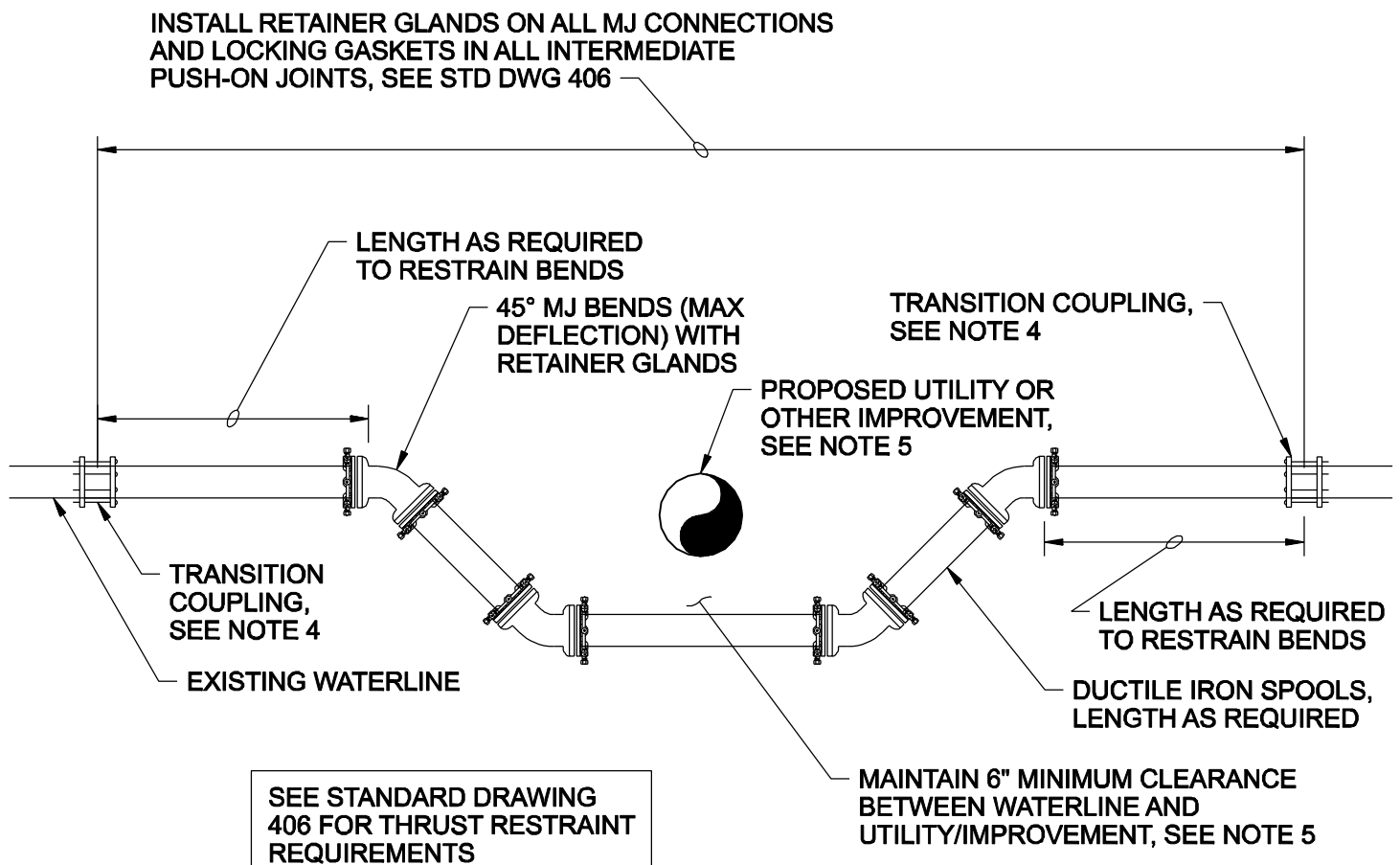
NO SCALE

DIVISION

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420



NOTES:

1. THIS DETAIL APPLIES TO SITUATIONS WHERE AN EXISTING WATERLINE NEEDS TO BE RELOCATED UNDER A PROPOSED IMPROVEMENT. THE NEED FOR ADDITIONAL REQUIREMENTS, SUCH AS VALVES, BLOW-OFF ASSEMBLIES, ETC., WILL BE DETERMINED BY THE CITY ENGINEER.
2. ALL NEW MATERIALS SHALL BE CLEANED AND DISINFECTED IN ACCORDANCE WITH THE STANDARD CONSTRUCTION SPECIFICATONS.
3. NEW PIPING INSTALLED IN EXISTING WATERLINES WILL BE VISUALLY CHECKED FOR LEAKS AT LINE PRESSURE. VERIFICATION OF RESTRAINT REQUIREMENTS AND VISUAL INSPECTIONS WILL BE PERFORMED BY THE CITY ENGINEER.
4. WHEN EXISTING WATERLINE IS DUCTILE OR CAST IRON USE A DUCTILE IRON SOLID SLEEVE MJ COUPLING TO MAKE CONNECTION TO EXISTING WATERLINE.
5. WHERE SANITARY SEWER LINES CROSS ABOVE OR WITHIN 18-INCHES VERTICAL SEPARATION BELOW A WATERLINE, SEWER MAINS AND/OR LATERALS SHALL BE REPLACED WITH AWWA C-900 PVC (SDR 18) AT THE CROSSING. CENTER ONE FULL LENGTH OF PIPE AT POINT OF CROSSING AND CONNECT TO EXISTING SEWER LINES WITH APPROVED FITTINGS OR COUPLINGS.



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TYPICAL WATERLINE
UNDERCROSSING

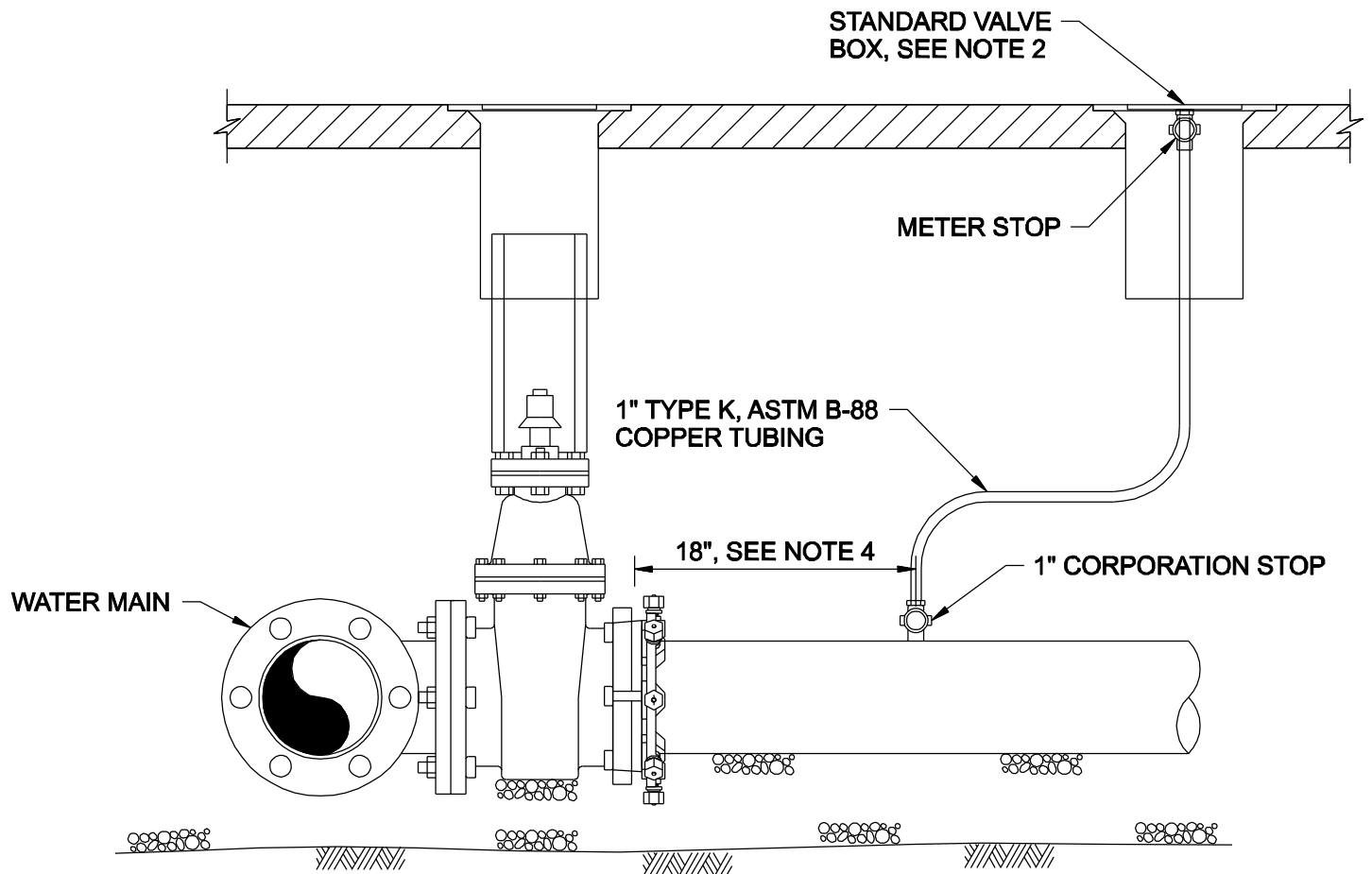
NO SCALE

DIVISION

WATER

DRAWING NO.

422



NOTES:

1. CHLORINATION PROCESS TO BE CONDUCTED BY CONTRACTOR IN ACCORDANCE WITH THE STANDARD CONSTRUCTION SPECIFICATIONS.
2. THE STANDARD VALVE BOX LOCATED OVER THE 1" CHLORINE LINE IS NOT REQUIRED TO BE INSTALLED IF CHLORINE LINE IS LOCATED BEHIND THE CURB IN THE PLANTER STRIP. THE VALVE BOX IS TO BE INSTALLED ONLY WHEN THE CHLORINE LINE IS LOCATED IN TRAFFIC AREAS.
3. CHLORINE LINE PLACED IN NON-TRAFFIC AREAS SHALL BE LOCATED 6" ABOVE FINISH GRADE AND SHALL BE MARKED WITH BRIGHT ORANGE FLAGGING OR RIBBON MATERIAL.
4. DISTANCE FROM THE GATE VALVE TO THE CHLORINE TAP SHALL BE 18" AS SHOWN. SEE STANDARD DRAWING 430 FOR TAP REQUIREMENTS.
5. TEMPORARY ASPHALT SURFACING WILL BE REQUIRED IN TRAFFIC AREAS.
6. CONTRACTOR TO REMOVE CHLORINATION ASSEMBLY AFTER RECEIVING NOTICE OF NEGATIVE BACTERIOLOGICAL TEST AND AFTER APPROVAL FROM THE CITY ENGINEER. CORP STOP SHALL BE REMOVED AND REPLACED WITH AN AWWA THREADED BRASS PLUG.



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TEMPORARY MAIN
LINE CHLORINATION
ASSEMBLY

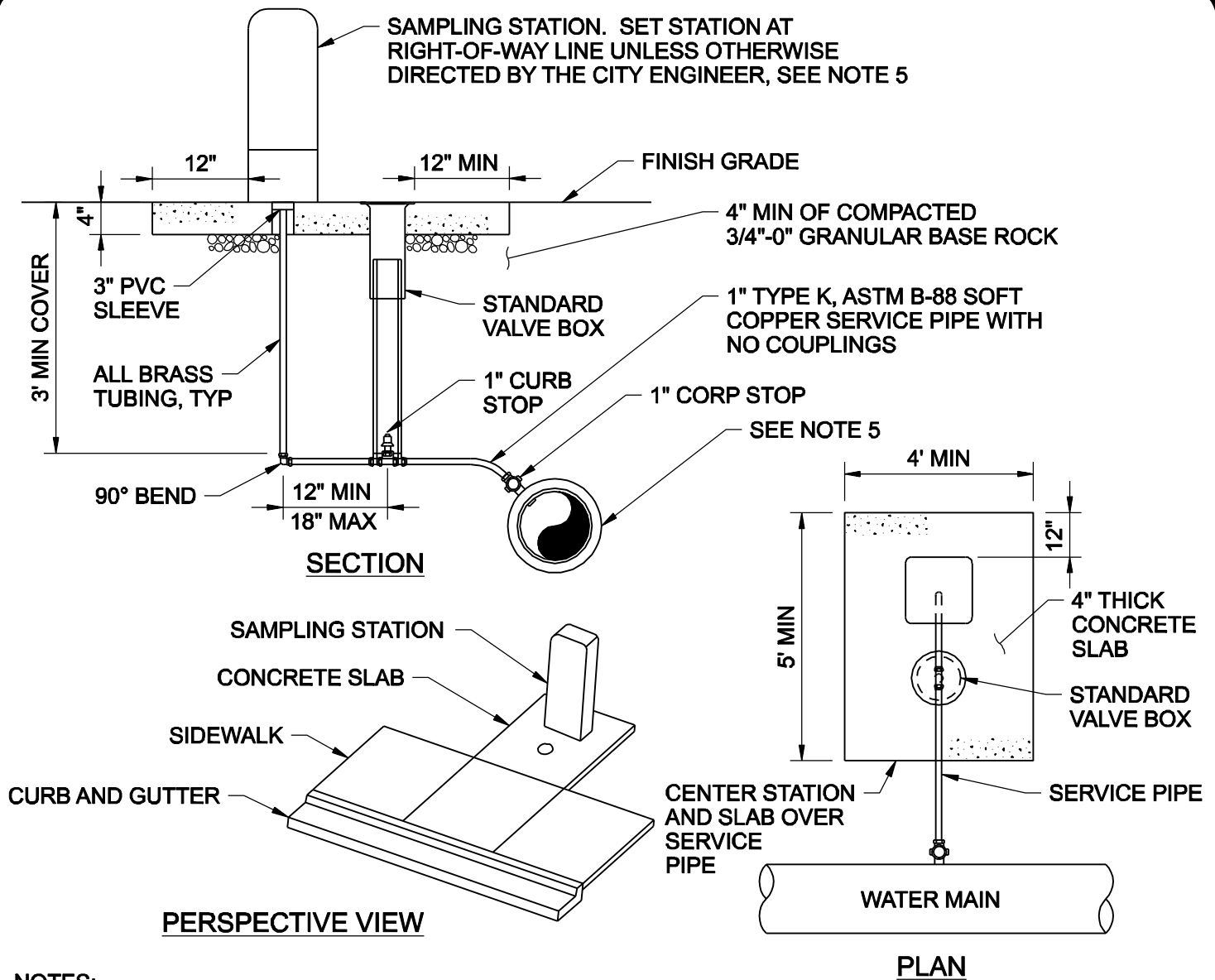
NO SCALE

DIVISION

WATER

DRAWING NO.

424



NOTES:

1. ALL MATERIALS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. SAMPLING STATION SHALL BE ECLIPSE NO. 88 SAMPLING STATION WITH THREADED OUTLET NOZZLE AND BRASS INTERIOR, STAND PIPE GALVANIZED EXTERIOR OR APPROVED EQUAL.
2. DOUBLE STRAP DUCTILE IRON SADDLES SHALL BE INSTALLED ON 4" DUCTILE IRON PIPE AND ALL SIZES OF CAST IRON AND STEEL PIPE. ALL DUCTILE IRON APPLICATIONS OVER 4" DIA SHALL BE DIRECT TAPPED FOR 1" SERVICE. STAINLESS STEEL SADDLES WITH STAINLESS STRAPS SHALL BE INSTALLED ON ASBESTOS CEMENT PIPE.
3. CATHODIC PROTECTION WILL BE REQUIRED FOR NEW COPPER SERVICES WHEN CONNECTING TO EXISTING ASBESTOS-CEMENT WATER LINES. THE METHOD OF PROVIDING CATHODIC PROTECTION WILL REQUIRE THE APPROVAL OF THE CITY ENGINEER. WHEN CROSSING A CATHODICALLY PROTECTED SYSTEM, INSTALL WITHIN PVC SLEEVE.
4. CUTTING, REAMING, SIZE, AND BENDING OF COPPER TUBING SHALL BE PERFORMED USING TOOLS AND PRACTICES SPECIFIC TO THOSE OPERATIONS. ALL COPPER SERVICE PIPES SHALL BE DIRECT BURIED IN ROCK BACKFILL TO AVOID ANY COPPER CONTACT WITH NATIVE SOIL.
5. FINAL SAMPLING STATION LOCATION SHALL BE AS APPROVED AND DIRECTED BY THE CITY ENGINEER.



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**WATER
SAMPLING
STATION**

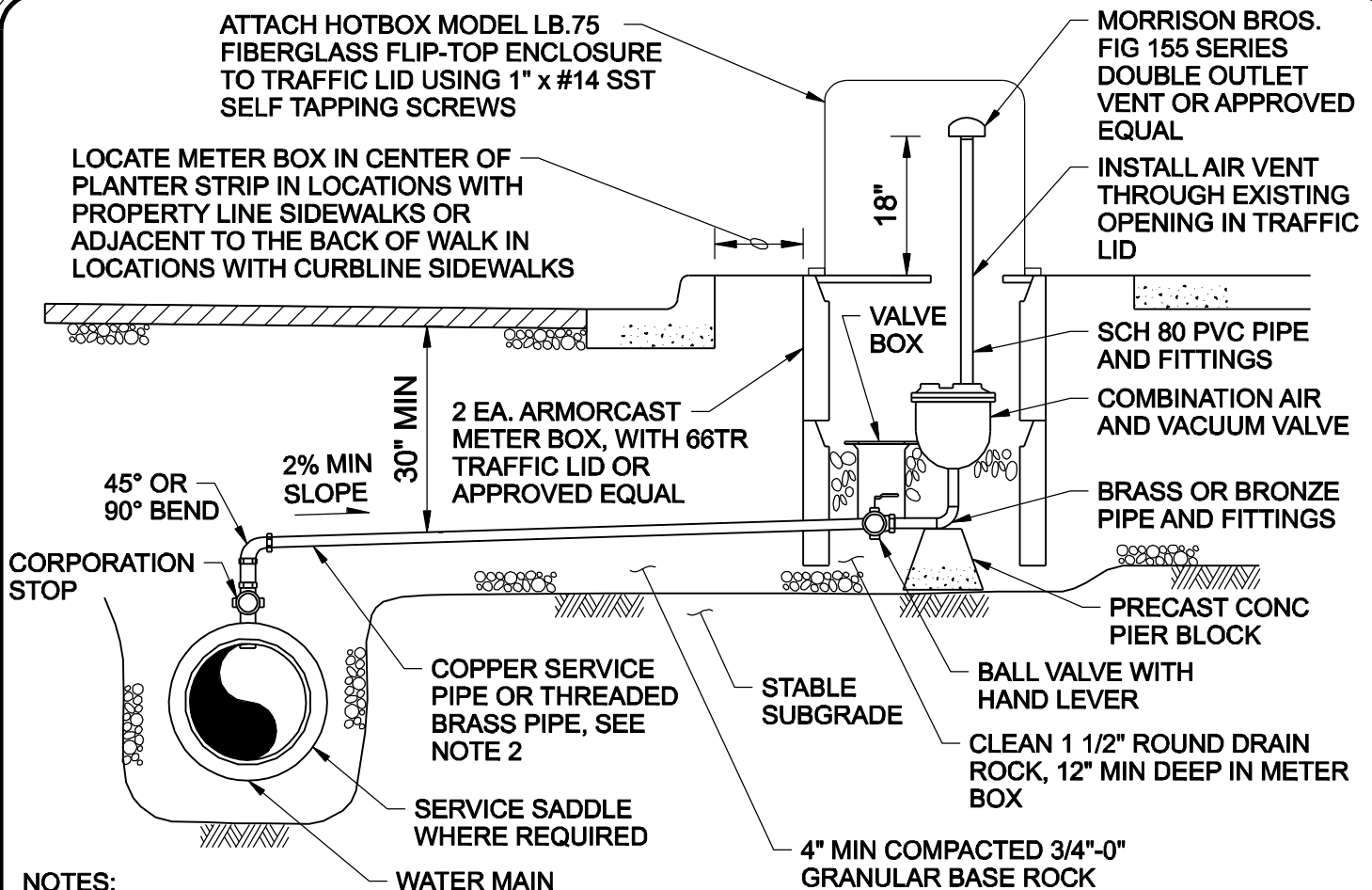
NO SCALE

DIVISION

WATER

DRAWING NO.

426



NOTES:

1. ALL MATERIALS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
2. CORPORATION STOP, 90° BEND, COPPER CONDUIT OR BRASS PIPE, HAND VALVE, AIR/VACUUM VALVE AND VENT PIPING SHALL BE SIZED AS FOLLOWS: 1" COMPONENTS FOR 12" AND SMALLER WATER LINES AND 2" COMPONENTS FOR 16" AND LARGER WATER LINES, UNLESS SHOWN OTHERWISE.
3. DUCTILE IRON SADDLES SHALL BE INSTALLED ON 4" DUCTILE IRON PIPE, ALL SIZES OF CAST IRON AND STEEL PIPES, AND WITH ALL 1-1/2" AND 2" TAPS (REGARDLESS OF PIPE MATERIAL). ALL DUCTILE IRON APPLICATIONS OVER 4" DIA SHALL BE DIRECT TAPPED. STAINLESS STEEL SADDLES WITH STAINLESS STRAPS SHALL BE INSTALLED ON ASBESTOS CEMENT PIPE.
4. ALL COMPONENTS INSTALLED BETWEEN THE HAND VALVE AND THE AIR/VACUUM VALVE SHALL BE BRASS OR BRONZE.
5. THE AIR/VACUUM VALVE SHALL BE SET PLUMB AND CENTERED EACH WAY IN THE METER BOX.
6. CATHODIC PROTECTION WILL BE REQUIRED FOR NEW COPPER SERVICES WHEN CONNECTING TO EXISTING ASBESTOS-CEMENT WATER LINES. THE METHOD OF PROVIDING CATHODIC PROTECTION WILL REQUIRE THE APPROVAL OF THE CITY ENGINEER.
7. AIR VALVE VENT SHALL BE EXTENDED ABOVE GRADE TO PREVENT BACKFLOW CONTAMINATION. LOCATION OF THE VENT WILL BE SITE SPECIFIC AND WILL BE DETERMINED BY THE CITY ENGINEER.
8. CUTTING, REAMING, SIZE, AND BENDING OF COPPER TUBING SHALL BE PERFORMED USING TOOLS AND PRACTICES SPECIFIC TO THOSE OPERATIONS.
9. ALL COPPER SERVICE PIPES SHALL BE DIRECT BURIED IN GRANULAR BACKFILL MATERIAL TO AVOID ANY COPPER CONTACT WITH NATIVE SOIL. SERVICE LINES SHALL NOT BE INSTALLED BY JACKING OR BORING.



DEPARTMENT OF
PUBLIC WORKS

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REVISIONS

STANDARD DRAWING TITLE

1" AND 2" COMBINATION
AIR/VACUUM RELEASE
VALVE

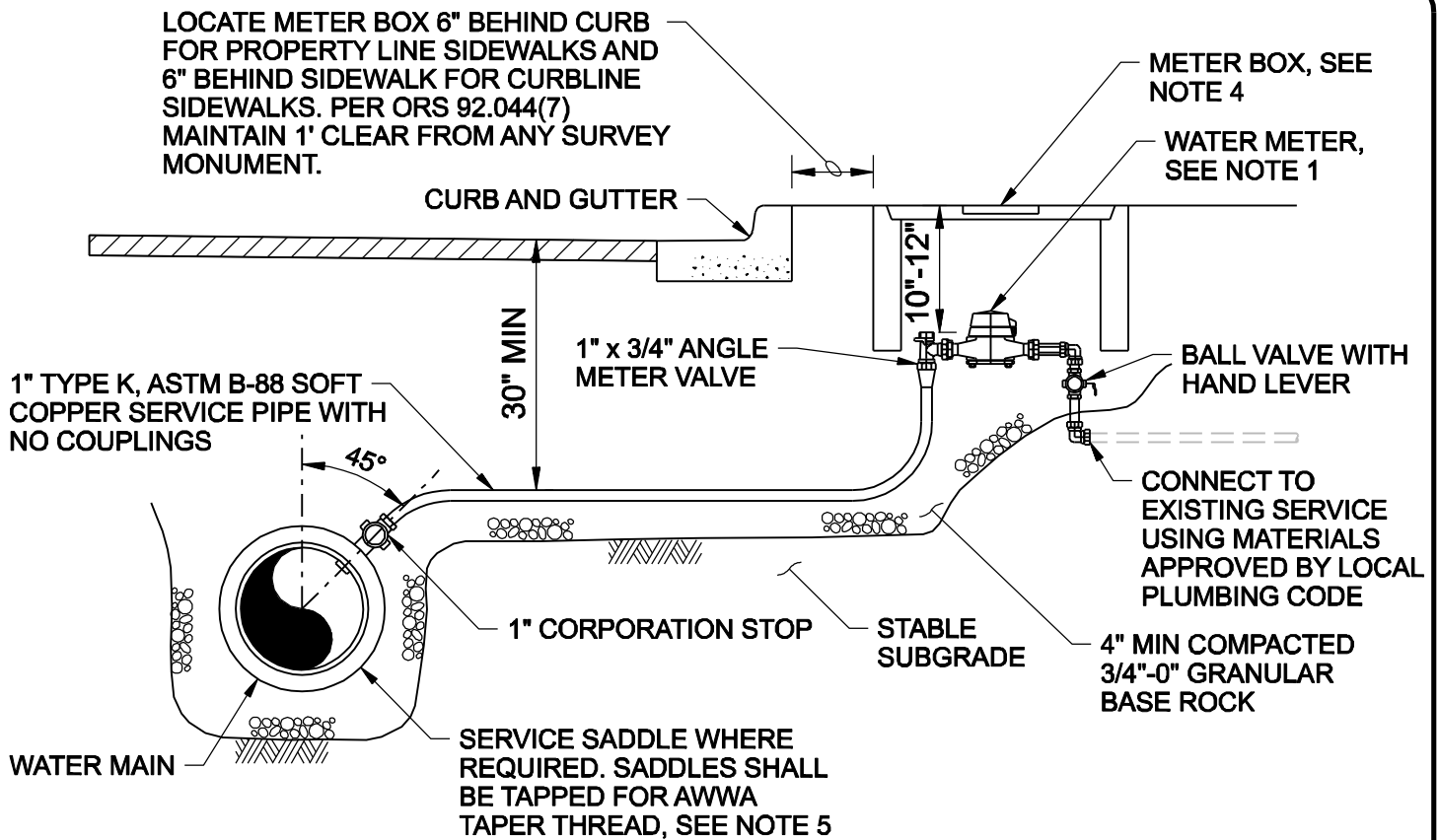
NO SCALE

DIVISION

WATER

DRAWING NO.

428



3/4" AND 1" METERS

NOTES:

1. WITH THE EXCEPTION OF THE WATER METER, ALL MATERIALS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. A CITY WATER METER PERMIT IS REQUIRED TO OBTAIN A WATER METER.
2. CORPORATION STOP, COPPER SERVICE LINE, AND WATER METER SHALL BE SIZED AS SPECIFIED.
3. THE METER SHALL BE SET PLUMB AND CENTERED EACH WAY INSIDE THE METER BOX.
4. METER BOX SHALL BE A 13" x 24" x 12" ARMORCAST POLYMER CONCRETE METER BOX. PROVIDE ALL METER BOXES WITH KNOCKOUTS FOR TOUCH-READ SENSORS.
5. DOUBLE STRAP DUCTILE IRON SADDLES SHALL BE INSTALLED ON 4" DUCTILE IRON PIPE AND ALL SIZES OF CAST IRON AND STEEL PIPE. ALL DUCTILE IRON APPLICATIONS OVER 4" DIA SHALL BE DIRECT TAPPED FOR 1" SERVICES. STAINLESS STEEL SADDLES WITH STAINLESS 4" STRAPS SHALL BE INSTALLED ON ASBESTOS CEMENT PIPE.
6. CATHODIC PROTECTION WILL BE REQUIRED FOR NEW COPPER SERVICES WHEN CONNECTING TO EXISTING ASBESTOS-CEMENT WATER LINES. THE METHOD OF PROVIDING CATHODIC PROTECTION WILL REQUIRE THE APPROVAL OF THE CITY ENGINEER.
7. CUTTING, REAMING, SIZE, AND BENDING OF COPPER TUBING SHALL BE PERFORMED USING TOOLS AND PRACTICES SPECIFIC TO THOSE OPERATIONS.
8. ALL COPPER SERVICE PIPES SHALL BE DIRECT BURIED IN GRANULAR BACKFILL TO AVOID ANY COPPER CONTACT WITH NATIVE SOIL. SERVICE LINES SHALL NOT BE INSTALLED BY JACKING OR BORING.



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**3/4" AND 1"
WATER SERVICES**

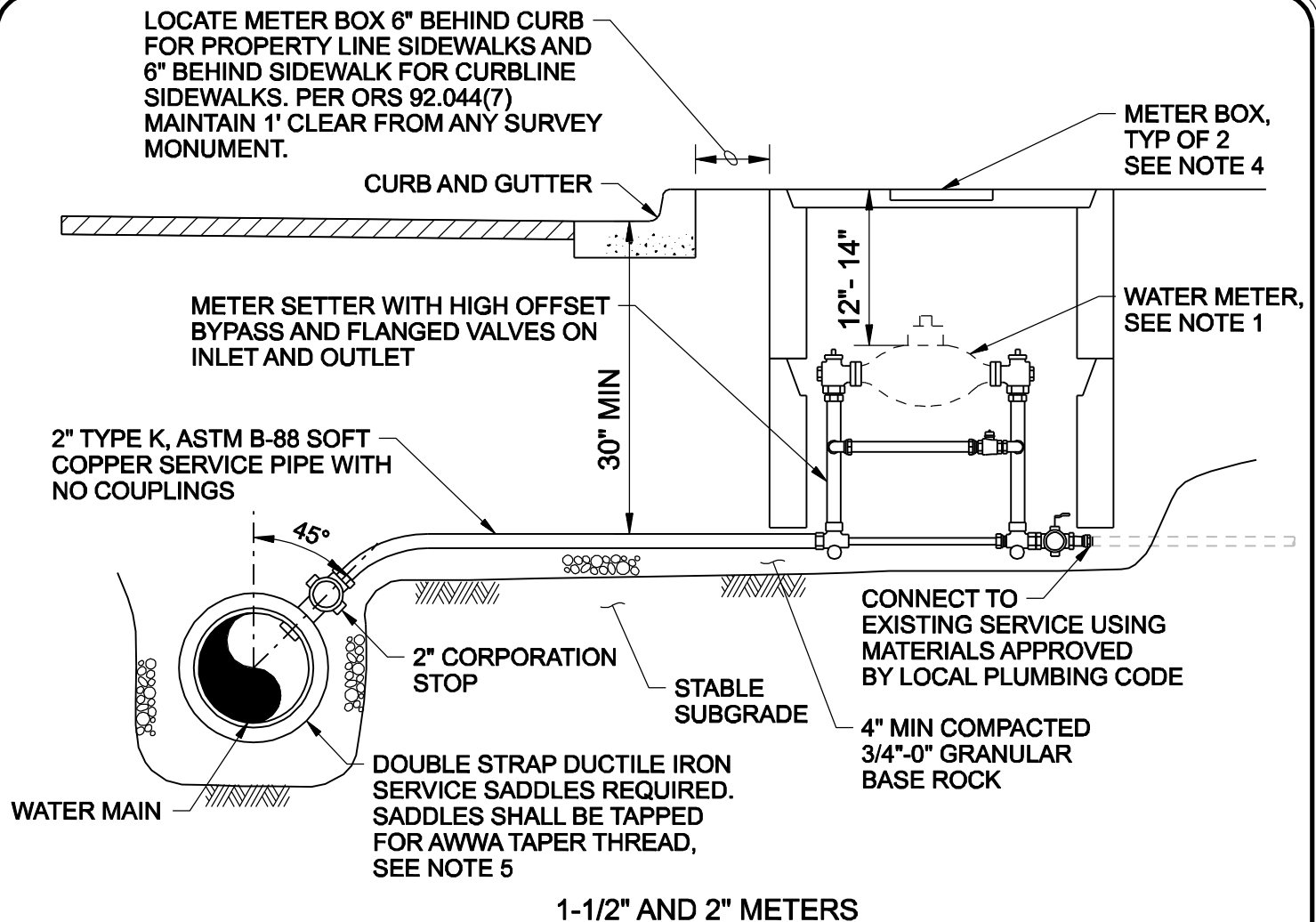
NO SCALE

DIVISION

WATER

DRAWING NO.

430



NOTES:

1. WITH THE EXCEPTION OF THE WATER METER, ALL MATERIALS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. A CITY WATER METER PERMIT IS REQUIRED TO OBTAIN A WATER METER.
2. CORPORATION STOP, COPPER SERVICE LINE, AND WATER METER SHALL BE SIZED AS SPECIFIED.
3. THE METER SHALL BE SET PLUMB AND CENTERED EACH WAY INSIDE THE METER BOX.
4. METER BOX SHALL BE A 17" x 30" x 12" ARMORCAST POLYMER CONCRETE METER BOX. PROVIDE ALL METER BOXES WITH KNOCKOUTS FOR TOUCH-READ SENSORS.
5. DOUBLE STRAP DUCTILE IRON SADDLES SHALL BE INSTALLED ON 4" DUCTILE IRON PIPE AND ALL SIZES OF CAST IRON AND STEEL PIPE. STAINLESS STEEL SADDLES WITH STAINLESS STRAPS SHALL BE INSTALLED ON ASBESTOS CEMENT PIPE. SADDLES ARE REQUIRED FOR ALL 1-1/2" AND 2" TAPS.
6. CATHODIC PROTECTION WILL BE REQUIRED FOR NEW COPPER SERVICES WHEN CONNECTING TO EXISTING ASBESTOS-CEMENT WATER LINES. THE METHOD OF PROVIDING CATHODIC PROTECTION WILL REQUIRE THE APPROVAL OF THE CITY ENGINEER.
7. CUTTING, REAMING, SIZE, AND BENDING OF COPPER TUBING SHALL BE PERFORMED USING TOOLS AND PRACTICES SPECIFIC TO THOSE OPERATIONS.
8. ALL COPPER SERVICE PIPES SHALL BE DIRECT BURIED IN GRANULAR BACKFILL TO AVOID ANY COPPER CONTACT WITH NATIVE SOIL. SERVICE LINES SHALL NOT BE INSTALLED BY JACKING OR BORING.



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STANDARD DRAWING TITLE

1-1/2" AND 2"
WATER SERVICES

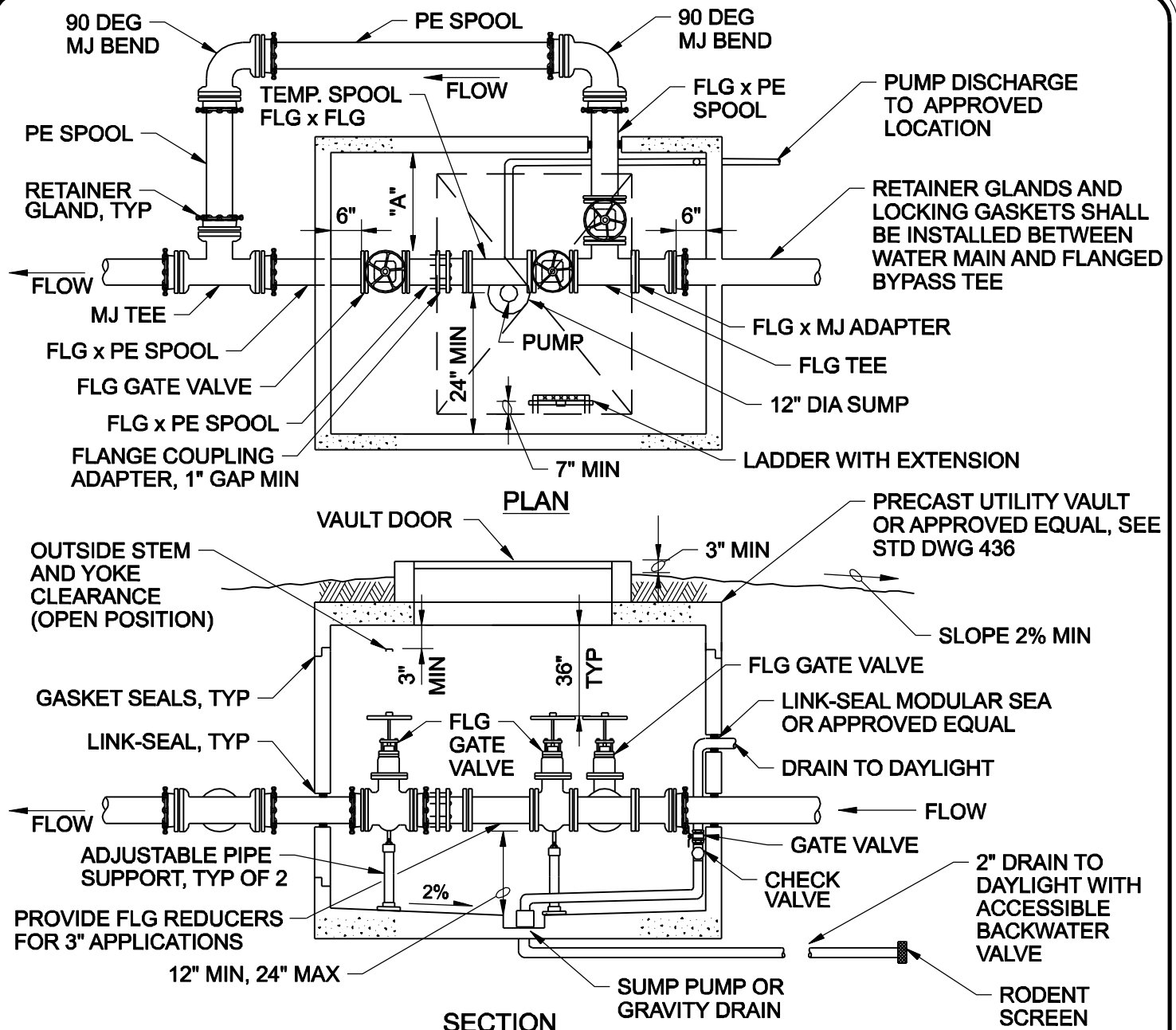
NO SCALE

DIVISION

WATER

DRAWING NO.

432



*SEE STANDARD DRAWING 436 FOR METER VAULT NOTES AND ADDITIONAL REQUIREMENTS.

SIZE	MODEL TYPE	TEMP SPOOL LENGTH	DIM "A" (MIN)	*VAULT MODEL NUMBER	MODEL TYPE	TEMP SPOOL LENGTH	DIM "A" (MIN)	*VAULT MODEL NUMBER	MODEL TYPE	TEMP SPOOL LENGTH	DIM "A" (MIN)	*VAULT MODEL NUMBER
3"	SRH COMPOUND	25"	18"	4484-LA	COMPACT FIRELINE	-	-	4484-LA	SENSUS W-350 DRS	20"	18"	4484-LA
4"	SRH COMPOUND	30"	18"	4484-LA	COMPACT FIRELINE	34"	18"	4484-LA	SENSUS W-1000 DRS	24"	18"	4484-LA
6"	SRH COMPOUND	34"	18"	4484-LA	COMPACT FIRELINE	46"	20"	612-LA	SENSUS W-2000 DRS	28"	18"	4484-LA
8"	SRH COMPOUND	-	-	-	COMPACT FIRELINE	54"	23"	612-LA	SENSUS W-3500 DRS	31"	18"	5106-WA
10"	SRH COMPOUND	-	-	-	COMPACT FIRELINE	69"	25"	612-LA	SENSUS W-5500 DRS	42"	18"	5106-WA



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STANDARD DRAWING TITLE

COMPOUND WATER
METER VAULT
DETAIL 1 OF 2

NO SCALE

DIVISION

WATER

DRAWING NO.

434

NOTES:

1. SEE STANDARD DRAWING 434 FOR COMPOUND WATER METER VAULT DETAILS.
2. WATER METER VAULTS ARE REQUIRED ON ALL DOMESTIC WATER CONNECTIONS 3" OR LARGER IN DIAMETER. A PERMIT WILL BE REQUIRED TO OBTAIN A WATER METER. THE METER WILL BE SUPPLIED AND INSTALLED BY THE CITY AT THE CONTRACTOR'S EXPENSE.
3. ALL MATERIALS, INCLUDING THE TEMPORARY SPOOL, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
4. FINISHED GRADE SHALL SLOPE AWAY FROM THE VAULT COVER TO PREVENT PONDING AROUND THE COVER.
5. SLOPE INTERIOR TOWARD CENTER OF FLOOR TO SUMP OR GRAVITY DRAIN OUTLET.
6. METER VAULTS SHALL BE CONSTRUCTED WITH A DRAIN SYSTEM COMPRISED OF A 2" MINIMUM GRAVITY SYSTEM OR A BUILT-IN SUMP WITH AN AUTOMATIC PUMP. AUTOMATIC PUMPS SHALL BE A MINIMUM OF 1/4 HP. OPERATING ON 110 AC POWER. SUMP PUMPS SHALL HAVE BUILT-IN VERTICAL FLOATS. GRAVITY AND PUMP DRAINAGE SYSTEMS WILL REQUIRE REVIEW AND APPROVAL OF THE CITY ENGINEER.
7. PIPE PENETRATIONS SHALL BE CORE DRILLED REGARDLESS OF THE PRESENCE OF "KNOCKOUTS". SEAL PIPE PENETRATIONS WITH PSI LINK-SEAL MODULAR SEAL MODEL "S-316", OR APPROVED EQUAL TO ACHIEVE A WATERTIGHT SEAL. PIPING SHALL NOT BE DIRECTLY EMBEDDED IN CONCRETE.
8. THE MINIMUM DIAMETER OF PIPE, VALVES, AND FITTINGS SHALL BE 4". THE BYPASS PIPE SHALL BE THE SAME SIZE AS THE MAIN SERVICE PIPE OR A MINIMUM OF 4", WHICHEVER IS LARGER.
9. INSTALL LOCKING GASKETS IN ALL PUSH-ON JOINT CONNECTIONS AND RETAINER GLANDS ON ALL MJ FITTINGS AND VALVES.
10. ALL VALVES SHALL BE RISING -STEM STYLE AND SHALL BE INSTALLED WITH HAND WHEELS. HAND WHEELS SHALL MEET ALL REQUIREMENTS OF AWWA C509-94, SECTION 4.11.
11. MINIMUM VERTICAL CLEARANCE BETWEEN VAULT CEILING AND TOP OF HAND WHEEL SHALL BE 36". VERTICAL CLEARANCE BETWEEN VAULT FLOOR AND BOTTOM OF PIPE SHALL BE A MINIMUM OF 12" AND A MAXIMUM OF 24".
12. USE GRINNEL ADJUSTABLE SADDLE PIPE SUPPORTS, OR APPROVED EQUAL, UNDER EACH METER ISOLATION VALVE.
13. METER VAULTS SHALL BE SUPPLIED WITH AN ALUMINUM LADDER WITH EXTENSION TO BE O.S.H.A APPROVED, (UTILITY VAULT 1672 OR APPROVED EQUAL). LADDER TO HAVE CLEAR ACCESS FROM VAULT DOOR.
14. METER VAULTS SHALL BE SUPPLIED WITH BILCO ALUMINUM ASSISTED ACCESS DOORS (H20-LOAD RATED). DOORS SHALL BE LOCATED DIRECTLY OVER THE METER. VAULT DOOR MECHANISMS SHALL NOT PROJECT BELOW THE CEILING OF THE VAULT INTERIOR. ANY VAULT TO BE SET IN TRAFFIC WILL REQUIRE AN H-20 RATED ACCESS DOOR OR CAST IRON MANHOLE FRAME AND COVER IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION, BOTH SUBJECT TO CITY APPROVAL.



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STANDARD DRAWING TITLE

**COMPOUND WATER
METER VAULT
DETAIL 2 OF 2**

NO SCALE

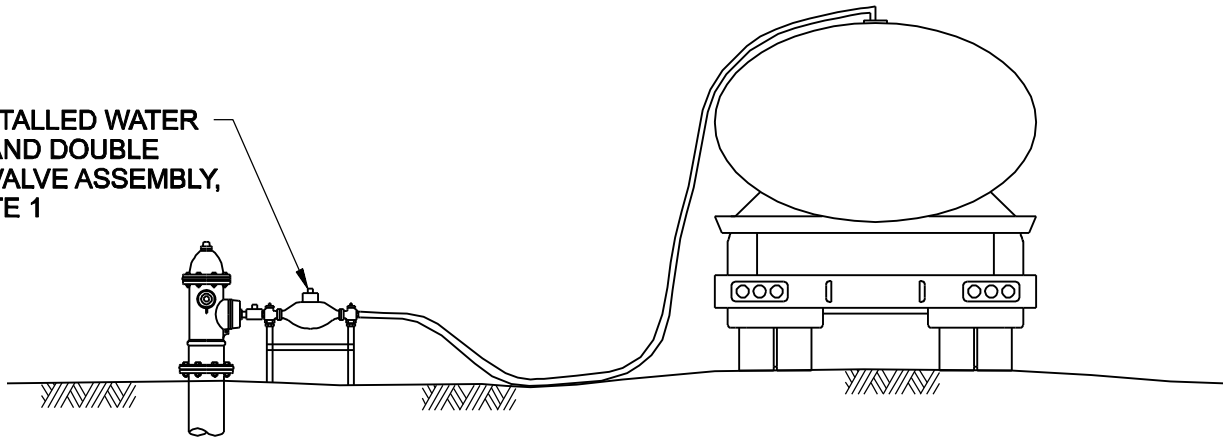
DIVISION

WATER

DRAWING NO.

436

CITY INSTALLED WATER
METER AND DOUBLE
CHECK VALVE ASSEMBLY,
SEE NOTE 1



**CITY INSTALLED PORTABLE
BACKFLOW PREVENTION ASSEMBLY**

NOTES:

1. CITY PERMIT WILL BE REQUIRED TO BE OBTAINED BY THE CONTRACTOR FOR CITY SUPPLIED WATER METER/DOUBLE CHECK VALVE ASSEMBLY. WATER METER/ DOUBLE CHECK VALVE ASSEMBLY WILL BE REQUIRED REGARDLESS OF TANK MOUNTED ASSEMBLIES AND WILL BE INSTALLED BY THE CITY.
2. ALL REQUIRED WATER SYSTEM BACKFLOW PROTECTION COMPONENTS AND CITY INSTALLATION COSTS INCURRED WILL BE AT THE CONTRACTOR'S EXPENSE.



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**MINIMUM PROTECTION
FOR FILLING
TANKER TRUCK**

NO SCALE

DIVISION

WATER

DRAWING NO.

438